

The listing of claims will replace all prior versions, and listings, of claims in the application. Claims 2, 17 and 23-30 have been canceled. New claims 31-35 have been added:

Listing of Claims:

1. (Currently Amended) A substrate panel for use in semiconductor packaging, comprising:

a lead-frame panel, including an array of device areas, each device area having a plurality of contacts exposed on a bottom surface of the substrate panel, a plurality of wire bonding landings exposed on a top surface of the substrate panel, and lead segments electrically coupling selected wire bonding landings to associated contacts; and

a dielectric material that fills spaces between adjacent lead segments, wherein a top surface of the dielectric material is substantially coplanar with the top surface of the substrate panel and the wire bonding landings, and the bottom surface of the dielectric material is substantially coplanar with the bottom surface of the substrate panel and the lead contacts, thereby forming a substrate panel having substantially planar top and bottom surfaces.

2. (Canceled)

3. (Original) A substrate panel as recited in claim 1 wherein the wire bonding landings are thinner than the substrate panel, such that the wire bonding landings are not exposed on the bottom surface of the substrate panel.

4. (Original) A substrate panel as recited in claim 1 wherein at least selected portions of the lead segments are thinner than the substrate panel such that the selected portions of the lead segments are not exposed on the bottom surface of the substrate panel.

5. (Currently Amended) A substrate panel as recited in claim 1 wherein the device areas are arranged in at least one two dimensional array such that the substrate has at least one two-dimensional array of device areas.

6. (Currently Amended) A substrate panel as recited in claim 1 wherein the lead-frame further comprises a matrix of tie bars, the tie bars being positioned between immediately adjacent device areas in the two dimensional array of device areas and configured to support the lead segments.

7. (Original) A substrate panel as recited in claim 1 wherein each device area further includes a die attach pad, the die attach pad being exposed on the top surface of the substrate panel.

8. (Original) A substrate panel as recited in claim 7 wherein the die attach pad has a plurality of posts exposed on the bottom surface of the substrate panel.

9. (Currently Amended) A substrate panel as recited in claim 7 wherein at least one of the wire bonding landings is directly electrically coupled to the die attach pad by only an additional lead segment.

10. (Currently Amended) A substrate panel as recited in claim 7 wherein ~~at least one of the contacts~~ are is located closer to the die attach pad than their associated ~~between the wire bonding landings and the die attach pad.~~

11. (Original) A substrate panel for use in semiconductor packaging, comprising:

a lead-frame panel including a two dimensional array of device areas, each device area having a plurality of contacts exposed on a bottom surface of the substrate panel, a plurality of wire bonding landings exposed on a top surface of the substrate panel, and lead segments electrically coupling selected wire bonding landings to associated contacts; and

a dielectric material that fills spaces between adjacent lead segments, wherein a top surface of the dielectric material is substantially coplanar with the top surface of the substrate panel and the wire bonding landings, and a bottom surface of the dielectric material is substantially coplanar with the bottom surface of the substrate panel and the lead contacts; and

wherein at least some of the wire bonding landings are thinner than the substrate panel, such that the thinner wire bonding landings are not exposed on the bottom surface of the substrate panel, and at least selected portions of the lead segments are thinner than the substrate

panel such that the selected portions of the lead segments are not exposed on the bottom surface of the substrate panel.

12. (Original) A substrate panel as recited in claim 11 wherein each device area further includes a die attach pad, the die attach pad being exposed on the top surface of the substrate panel.

13. (Original) A substrate panel as recited in claim 12 wherein the contacts surround the die attach pad, and wherein the die attach pad has a plurality of posts exposed on the bottom surface of the substrate panel, the contacts and the posts being arranged in a two dimensional array.

14. (Currently Amended) A substrate panel as recited in claim 12 wherein at least one of the wire bonding landings is directly electrically coupled to the die attach pad by only an additional lead segment.

15. (Currently Amended) A singulated packaged integrated circuit, comprising:

a substrate ~~having a device area and a thickness, the device area further~~ including a plurality of contacts exposed on a bottom surface of the substrate, a plurality of wire bonding landings exposed on a top surface of the substrate, lead segments electrically coupling the wire bonding landings to associated lead contacts, and a first dielectric layer that fills spaces between adjacent lead segments, wherein a top surface of the dielectric layer is substantially coplanar with the top surface of the substrate and the wire bonding landings, and a bottom surface of the dielectric layer is substantially coplanar with the bottom surface of the substrate panel and the lead contacts, thereby forming a substrate having substantially planar top and bottom surfaces;

a die mounted on the substrate, the die having a plurality of bond pads configured for electrical connection to the wire bonding landings;

a plurality of connectors for electrically connecting the plurality of bond pads to associated wire bonding landings; and

a second dielectric layer that encapsulates the die and the plurality of connectors and covers at least a portion of the top surface of the substrate.

16. (Currently Amended) A packaged integrated circuit as recited in claim 15 wherein the first and second dielectric layers are formed from substantially the same materials but are not integrally formed.

17. (Cancelled)

18. (Original) A packaged integrated circuit as recited in claim 15 wherein the wire bonding landings are thinner than the thickness of the substrate, such that the wire bonding landings are not exposed on the bottom surface of the substrate.

19. (Original) A packaged integrated circuit as recited in claim 15 wherein at least selected portions of the lead segments are thinner than the thickness of the lead-frame, such that the selected portions of the lead segments are not exposed on the bottom surface of the substrate.

20. (Original) A packaged integrated circuit as recited in claim 15 wherein the substrate further includes a die attach pad surrounded by the lead contacts, the die attach pad being exposed on the top surface of the substrate.

21. (Original) A packaged integrated circuit as recited in claim 20 wherein the die attach pad has a plurality of posts that are exposed on the bottom surface of the substrate.

22. (Currently Amended) A packaged integrated circuit as recited in claim 20 wherein at least one of the wire bonding landings is directly electrically coupled to the die attach pad by only an additional lead segment.

23. (Original) A packaged integrated circuit as recited in claim 20 wherein at least one of the contacts is located between the wire bonding landings and the die attach pad.

Claims 24 – 30 (Cancelled)

31. (new) A substrate panel as recited in claim 11 wherein the wire bonding landings are located radially further from a center of their associated device area than their associated contacts and wherein the substrate panel has substantially planar top and bottom surfaces with the wire bond landings and the lead segments being exposed on the top surface of the substrate but not the bottom surface of the substrate.

32. (new) A substrate panel as recited in claim 1 wherein at least some of the wire bonding landings have a width that is wider than an immediately adjacent portion of their associated lead segments and a thickness that is substantially the same as their associated lead segments.

33. (new) A substrate panel as recited in claim 11 wherein at least some of the wire bonding landings have a width that is wider than an immediately adjacent portion of their associated lead segments and a thickness that is substantially the same as their associated lead segments.

34. (new) A substrate panel as recited in claim 11 wherein the device areas are each arranged as microarrays.

35. (new) A packaged integrated circuit as recited in claim 15 wherein the package is a leadframe based microarray package.